P-185

CONFIDENTIAL

24 September 1956

MEMORANDUM FOR: THE RECORD

SUBJECT : Project Monitor at [redacted] 25X1

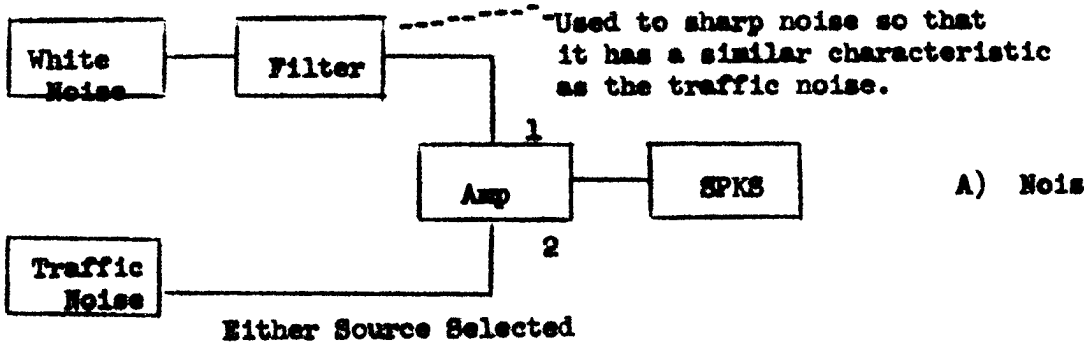
1. TIME AND PLACE OF MEETING: The meeting was held 11 September 1956 in [redacted] 25X1

Document No. 7 25X1

2. ATTENDANCE: [redacted]

3. DISCUSSION:

A. The test range described in the last report has been used to determine the effectiveness of the parabolic and condensor microphones. Since the expected improvement using the combination of line elements and reflecting surface is thought to be 3-5 db, These measurements will indicate what sort of improvement could be expected. The following setup is being used to feed the speaker:



A) Noise

B) Pickup

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The noise feeds the 12 speakers spaced in a semi-circle and all the speakers are adjusted so that they point toward the center speaker from which the speech is coming. The speech used is a speaker reading several paragraphs of printed material. The pickups used were:

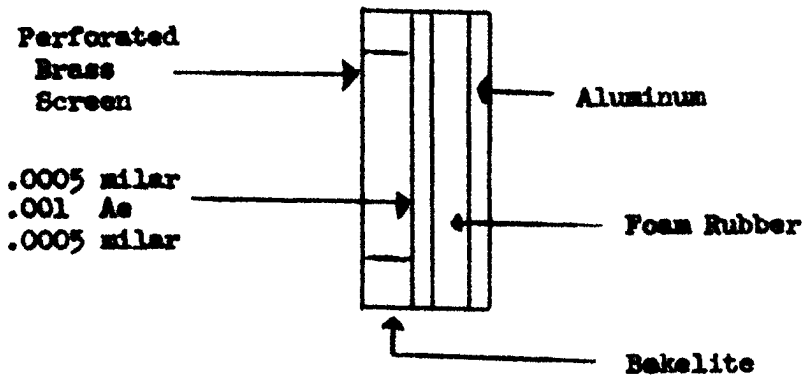
(1) The 2 foot parabola with a BKIA moving coil microphone

(2) The 2 foot condenser microphone

(3) A 77D Ribbon microphone used as an indirectional pickup

The level of noise and speech was adjusted until little intelligibility was obtained by just listening with the ear. Then attempts were made to listen with the three pickup devices. The directional pickups definitely improved the overall intelligibility. However, it was difficult to tell how much of an improvement was present for the condition where traffic noise was present, as its level was continually varying. Although these tests indicate that directional microphones improve the solution, all you can expect is information regarding relative improvement. The absolute ability of the microphone to pickup at a distance will depend entirely on the given situation.

The construction of the condenser microphone is the following:



The diaphram is stretched (but not too tightly) across the face of the microphone. The mechanical resonance of the diaphram is below 100 cycles/second. There is a resonance present of about 3000 cycles/second, but this is mainly due to the action of the diaphram with the foam rubber. The response of the microphone is fairly flat to about 3 KC because of the directivity effects present.

Work is presently going on in the design and testing of the line elements to be tried. The individual modular sections have to be properly balanced to achieve the desired characteristic.

[redacted] was given a copy of the word intelligibility lists used in the tests by TSS/APD. Although he thought sentence intelligibility more indicative of performance, he agreed to try to work up some tests using this list. 25X1

25X1 b. The cut down version of the [redacted] BK6B was shown to
25X1 the undersigned by [redacted] The drawings showing the case design and the response curves of the microphone under various conditions are attached. The microphone was placed inside the anechoic chamber and a conversation held 10-12 feet away (in the chamber) was listened to under the following different conditions:

(1) Microphone alone

(2) Microphone with 6" tube (tube will fit into ½" hole)

(3) Microphone with a piece of masking tape across the opening and a small pin hole in the tape.

(4) Microphone and 6" tube in the masking tape across the opening and a small pin hole in the tape.

Under all conditions the response sounded very good and it was almost impossible to distinguish between the various circumstances. The microphone seems very ruggedly constructed and well shielded. A unique path length design (shown in the drawing) not only gives the desired response characteristic but affords good protection to the diaphram.

The breadboard design of the transistor amplifier has been completed and tests show it to be satisfactory. By mounting it on a wafer in back of the microphone RCA thinks they will only add 3/16" to the overall length of the un-transistorized microphone. It is possible to keep the size down by cutting down the magnetic structure of the basic microphone. This, however, introduces a 4 db loss in sensitivity

due to the lowering of the flux density. [redacted] will build a prototype of both the cut down structure microphone and a transistorized microphone (using the whole magnetic structure) for test and evaluation. It may be that both designs will have value. 25X1

The British probe microphones were given to [redacted] together with a length of tubing which is used as the probe. He was going to run response curves on them and when the undersigned visited [redacted] next time he could listen to them in the anechoic chamber. (Note: The curves of these mikes are attached to this report. Also when looking at the curves they must be corrected by noting the responses of the source being used. The same source characteristics are used in both sets of curves presented.) 25X1 25X1

c. The results to date on the noise reduction problem are not encouraging. Using band width of about 125 cps (and four different center frequencies) tests were run to see if the signal in the bands was above the noise when the s/n ratio before the filter was unity. Results were negative and indicate that narrower filters will have to be used. There is, of course, a certain limit on how narrow you can make the band and still expect little distortion when you recombine. 25X1 [redacted] indicated that the problem is more involved than first anticipated.

In reviewing the basis on which the project is being conducted the following seems to be the hope of the investigators:

> That because of the randomness of noise and speech, there may be times, that by passing the combined signal through a series of narrow band filters, the speech in some of the bands during a given time interval will be above the noise. Then by means of threshold devices anytime the noise level is above the speech it will be eliminated.

d. The subject of a portable briefcase tape recorder was discussed with [redacted] The undersigned expressed the feeling that APD was interested in the proposal submitted by [redacted] but would prefer if [redacted] would consider a broader approach. [redacted] thought this could be done and it was agreed that APD would submit a specification expressing (in more detail) what is wanted in the way of a briefcase recorder. 25X1 25X1 25X1

The subject of the dynamic range capabilities of recording heads with very small gap widths was discussed. [redacted] agreed that in general the dynamic range of the heads fall off as the 25X1

size of the gap is decreased. However, the dynamic range is a fen of frequency. He presented curves showing that for a typical TV recording head (gap width 1/20,000") the s/n is roughly about 40 db above 100,000 cps but falls off badly below this.

25X1 [redacted] also presented curves taken with a head of gap width 1/5000" which at a tape speed of 3-3/4 inch/second gave a frequency response out to 15,000 cps with a s/n ratio of about 45 db over most of the range. He thought a head could be built so that using a tape speed of 1-7/8 inch/second, a frequency response of 100-8000 cps and a s/n ratio of 40 db could be obtained.

[redacted] 25X1

TBS/APD

Attachment:
As Mentioned Above

Distribution:
1 - P-119B
1 - P-185
1 - P-189
1 - Chrono

EPK/ls

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